

II. REMARKS:

Claims 1-9 were pending in this application and have been rejected. The present amendment amends claims 1-2 and 4-5 to more particularly point out and clarify Applicants' invention. No new matter has been added by the present amendment. After this amendment, claims 1-9 will be pending.

Reconsideration of the application in view of the above amendments and following remarks is respectfully requested.

Rejection(s) under 35 U.S.C. § 103

Claims 1-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 1,388,488 issued to Senn ("Senn") in view of U.S. Patent No. 5,850,741 issued to Feher ("Feher"). In view of the amendments and remarks contained herein, Applicants respectfully submit that the rejections of claims 1-9 are traversed.

Applicants' invention is concerned with transferring heat between an upper most region and a lower region of the steering wheel rim while being isolated from any external cooling arrangement, thus cooling the warmer of the two regions. The rim has a heat pipe with a volatile liquid used for transferring the heat between the regions by vaporization and condensation of the liquid, and movement of the liquid and vapor therein. In order to facilitate vaporization of the volatile liquid, which inherently has an associated vapor pressure, the heat pipe is evacuated so as to

have an internal pressure substantially lower than atmospheric pressure. The lower pressure within the heat pipe is more easily exceeded by the rising vapor pressure of the volatile liquid as the liquid becomes heated, thus facilitating the liquid being volatilized at a lower temperature to improve heat transfer performance (e.g. absorbs heat energy via the latent heat of vaporization). The vapor then moves where it condenses in a cooler region of the heat pipe. A wick within the heat pipe moves the cooled, condensed liquid back to a warmer region of the heat pipe. Accordingly, claim 1 has been amended to recite that the metal tube has an internal pressure substantially below atmospheric pressure. The metal tube and the wick are cooperatively configured to extend from an upper-most region of the rim to a lower region of the rim to transfer heat between the upper-most and lower regions of the rim and to move the volatile liquid therebetween. Support for these amendments may be found in Applicants' application at paragraphs [0019]-[0021], [0024] and [0026].

Senn discloses a steering wheel with a rim that is heated so as to assist the driver in keeping his hands warm. The rim is formed from a hollow tube *c* that is bent into a circular shape. The opposing ends of the tube *c* are connected by a member *d*, which is provided with a neck and an opening. The opening is closed with a plug *g*, which carries an electric heating element *h*. A small portion of heating liquid *i* is placed within the hollow tube *c* of the rim where the heating element *h* extends into the liquid *i*, thereby vaporizing the liquid *i* as steam to fill the remainder of the hollow tube *c* to heat the entire periphery of the steering wheel. *Senn* at lines 30-107. Notably, however, *Senn* is silent on the internal pressure of the tube *c*

relative to the atmospheric pressure and more particularly, Senn fails to disclose that the internal pressure of the tube *c* is substantially below atmospheric pressure.

Feher discloses an apparatus 10 for modifying the temperature extremes at the hand grip regions 16 and 18 of a vehicle steering wheel 12. The apparatus 10 has a heat pump 20 including a thermoelectric device 30 that is mounted on the center, rear side of the steering wheel 12 adjacent the steering column. A U-shaped heat pipe 36 has two arms defining first and second heat pipe sections 22 and 24. The heat pipe sections 22 and 24 are secured to thermoelectric device 30 and extend outwardly from the center of the steering wheel 12 toward the hand grips 16 and 18 and have end portions that terminate within the hand grips 16 and 18. “The heat pipe 36 is generally dimensioned and of such a geometry that its outer two pipe sections 22 and 24 are bent downwardly at the circumferential portion of the steering wheel 12”. In the heating mode, fluid inside the heat pipe 36 vaporizes first and then condenses on the inside walls of the heat pipe 36 to warm the hand grip heat exchangers 26 and 28 (adjacent the hand grips 16 and 18). The inside of the heat pipe 36 is covered with a wicking material to transport condensed fluid back to the heat pump 20. *Feher* at Col. 2, line 30 – Col. 3, line 55, and Figures 2-6. Notably, however, Feher is silent on the internal pressure of the heat pipe 36 relative to the atmospheric pressure and more particularly, Feher fails to disclose that the internal pressure of the heat pipe 36 is substantially below atmospheric pressure.

Neither Senn nor Feher independently or in combination, disclose, teach or suggest the present invention recited in claim 1. In particular, neither Senn nor Feher independently or in combination, disclose, teach or suggest a metal tube of a

steering wheel containing a volatile liquid and having an internal pressure substantially below atmospheric pressure. In that both Senn and Feher lack the noted elements of claim 1, the rejections based thereon should be withdrawn.

Moreover, neither Senn nor Feher independently or in combination, disclose, teach or suggest the further limitations recited in claim 4 of a steering wheel rim comprises two heat pipes and two wicks where each of the two heat pipes contains one of the two wicks, and each of the two heat pipes and the corresponding wick extend around approximately half of the circumferentially extent of the rim from the upper-most region to a lower-most region of the rim.

Accordingly, Applicants believe that claim 1 and its dependent claims 2-9 are in a condition for allowance.

Conclusion

In view of the above amendments and remarks, it is respectfully submitted that the present form of the claims are patentably distinguishable over the art of record and that this application is now in condition for allowance. Such action is requested.

Respectfully submitted,

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